

## Development of the Vegetation Inside the Levee Following the High Water of 1927

BY CLAIR A. BROWN

In July 1926 a new levee was constructed about three miles south of Baton Rouge, La., and opposite the site of the new campus of Louisiana State University. This section of the levee runs approximately north and south and the river side or the "inside" of the levee slopes to the west. In the construction of the levee a depression was excavated many feet from the river bank (section A to B Fig. 2). The earth removed was used to build up the levee. The strip of land parallel to the levee is surrounded by water when the river reaches a height of twenty-five feet on the gauge, stage known as "bank full." This strip for convenience has been termed the "Island" and corresponds to section "C" of the profile in figure 2.

In October 1926 the writer visited this place for the first time and found a large, relatively bare mound of earth with many little gullies cut in the levee by the rains. At this time there were six species of plants found growing on the river side of the levee, none very abundant, but conspicuous on the bare earth.

*Senecio lobatus* Pers

*Medicago lupulina* L.

*Sonchus asper* (L). All.

*Capriola Dactylon* (L). Kuntze

*Erigeron philadelphicus* L.

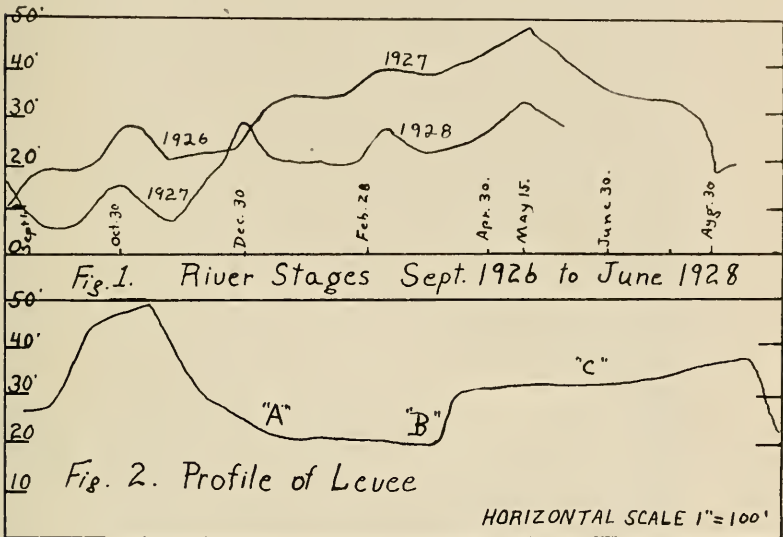
*Rumex* sp. basal rosettes.

Since it was impossible to reach the "island" without a boat, a complete list of the plants on the island is lacking, but it was covered with vegetation. The most conspicuous forms were *Salix*, *Populus*, *Platanus* and *Adelia*.

At this time the river was running at "bank full" and in the latter part of December rose to the "flood stage" of thirty-five feet. The water stayed at the flood stage until April 1927, when a rapid rise started, which culminated in one of the worst floods ever experienced in the lower Mississippi valley. The water reached the high peak of 47.9 feet May 15, 1927, and it is believed that it would have gone higher if breaks had not occurred. The elevation of the levee at the point of the writers observations was 49 feet. The accompanying graph shows the

differences in river heights from September 1926 to September 1927 and from September 1927 to June 1928 (Fig. 1).

The profile (Fig. 2) shows the elevation of the points mentioned, and the general topography from the road to the river. The ground from the high point of the levee to the point designated as "A" was practically bare of vegetation in October 1926. A to B was covered with water at the time of the first



visit. C is the region called the "Island," which when the level of the river drops below twenty-two feet is continuous with the rest of the levee.

In October 1927 the writer again visited the levee, and the change that had taken place was astonishing. The water between points A and B was gone. The region from the top of the levee to A was one complete mass of vegetation. The stretch from A to B as the photograph shows, consists of patches of plants scattered over the bare ground. A strip about 500 feet long and extending from the top of the levee to the water's edge was selected as a typical area of the newly vegetated levee and carefully botanized.

One of the striking features of the vegetation was the complete mat of *Eragrostis hypnoides* (Lam.) B.S.P. which covered all the slope down to point A. Through this carpet of grass the other plants protruded.

Another conspicuous feature was a series of rows of willow and poplar seedlings which marked quite closely the different heights of the receding waters.

Since water covered the "island" for approximately three months the first thought was what damage was done to the vegetation. The exact status of the herbaceous plants on the "island" was not known before the flood, and this question cannot be answered completely. The following plants withstood the effect of being submerged or partly submerged for that period of time.

<i>Salix nigra</i> Marsh.	<i>Salix longifolia</i> Muhl.
<i>Populus deltoides</i> Marsh.	<i>Adelia acuminata</i> Michx.
<i>Platanus occidentalis</i> L.	<i>Amorpha fruticosa</i> L.
<i>Gleditsia aquatica</i> Marsh.	<i>Rhus Toxicodendron</i> L.
<i>Ampelopsis cordata</i> Michx.	<i>Rubus trivialis</i> L.
<i>Ampelopsis arborea</i> (L.) Rusby	<i>Rubus</i> sp.
<i>Smilax Bona-nox</i> L.	<i>Aster</i> sp.—a perennial with
<i>Cyperus rotundus</i> L.	horizontal rootstalks

The other plants found on the "island" may have grown to maturity from seeds after the waters receded. It appears that the water aided in the germination of seeds as well as carrying seeds which came from plants not found in the immediate vicinity. Seeds of *Hicoria aquatica* Michx., *Hicoria minima* Britton (?), *Quercus macrocarpa* Michx., and *Mohrodendron*, which did not germinate were found on the ground. All of these came from a distance of more than three miles since the species mentioned are not represented between this locality and town.

Willows that had been submerged produced a mass of adventitious roots from the branches of the thick-barked old trees, and from the trunks of the smaller thin-barked trees. From a distance the trees appeared to be draped with spanish moss.

No detailed comparative studies were made to compare the amount of annual increment between the flooded and non-flooded trees, altho there appears to have been a decrease in the annual increment as compared with the increment of the previous year.

In a mimeographed letter from the Southern Forest Experiment Station, G. H. Lentz reports the killing of red gum, ash, elm, hickory, and oaks, especially the young seedlings which were submerged for some time. In one locality in Madison

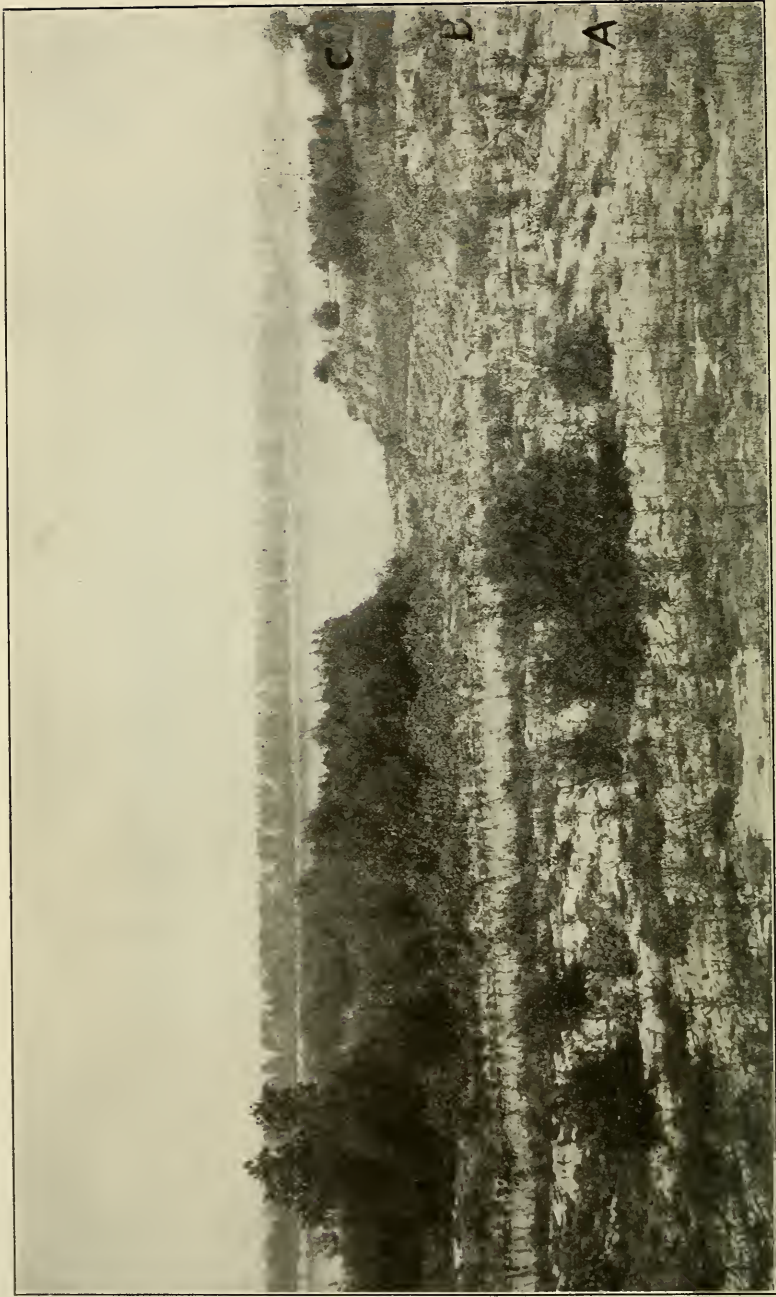


Photo by Brown.

Adventitious roots from the trunk of a willow sapling.

Parish, he reports a killing of approximately 60% of the trees examined.

Since the levee back of the college was newly constructed it was thought advisable to compare the vegetation with that of an old levee. A point was chosen on the opposite shore



Looking west, from the top of the new levee. Note the density of vegetation from A to B and on the "island" C.

Photo by Edgerton.

about three miles south of Port Allen, La. This levee had a longer and flatter base which is very sandy and in places mixed with silt loam. On this bench the vegetation was not as thick as on the new levee. However the slope of the levee proper had a thick sod and contained a smaller variety of plants as compared to the slope of the new levee. As this spot had never been visited before, it is impossible to compare the effects of the flood on the old levee. A study of the lists of plants from both sites does not show many differences.

In October 1927 the writer visited Melville, La. and other points in the flooded region. All along the road one could see the high water mark, on fences, trees, and buildings. The water mark was a foot or so above the ground in some places, a foot or more above the tops of the windows of the houses in others.

In this region the most striking feature was the abundance of two weeds, *Xanthium chinense* Mill. and *Croton* sp. These were so abundant as to appear as if they were planted crops. An examination of this region in March 1928 shows that there is a high percentage of germination of the cocklebur as well as other weeds.

Specimens of most of the plants listed have been preserved in the Louisiana State University Herbarium. Many duplicates have been sent to the New York Botanical Garden and to the University of Michigan Herbarium.

The nomenclature mainly follows that of Small's "Flora of Southeastern United States."

Plants found on the East side of the River from the  
top of the new levee to the "Island."

## TREES

- Salix nigra* Marsh. Seedlings.  
*Salix longifolia* Muhl. Seedlings.  
*Populus eeltoides* Marsh. Seedlings.

## SHRUBS

- Cephalanthus occidentalis* L.

## HERBS

## Alismaceae

- Lophotocarpus calycinus* (Engelm.)  
J. G. Smith

## Poaceae

- Eragrostis hypnoides* (Lam.) B. S. P.  
*Eragrostis glomeratus* (Walt.) Dewey  
*Capriola Dactylon* (L.) Kuntze  
*Sorghum vulgare* Pers. (var. *Durra*  
Bailey?)

## Cyperaceae

- Cyperus* 4 sp.  
*Fimbristylis autumnalis* (L.) R.  
& S.  
*Fimbristylis Vahlia* (Lam.) Link.

## Commelinaceae

- Commelina nudiflora* L.  
*Commelina hirtella* Vahl.

## Amaranthaceae

- Amaranthus viridis* L.

## Tetragoniaceae

- Mollugo verticillata* L.

## Brassicaceae

- Roripa palustris* (L.) Bess.  
*Roripa obtusa* (Nutt.) Britton

## Mimosaceae

- Mimosa strigillosa* T. & G.

## Fabaceae

- Strophostyles helvola* (L.) Ell.

## Euphorbiaceae

- Chamaesyce nutans* (Lag.) Small

## Malvaceae

- Sida rhombifolia* L.

## Lythraceae

- Ammannia coccinea* Rottb.  
*Rotala ramosior* (L.) Koehne

## Epilobiaceae

- Jussiaea decurrens* (Walt.) DC.  
*Jussiaea leptocarpa* Nutt.

## Convovulaceae

- Ipomoea lacunosa* L.  
*Ipomoea triloba* L.

## Solanaceae

- Physalis angulata* L.

## Verbenaceae

- Verbena* 2 sp.  
*Phyla lanceolata* (Michx.) Greene

## Rhinanthaceae

- Ilysanthes inaequalis* (Walt.) Pen-  
nell  
*Conobea multifida* (Michx.) Benth.

## Rubiaceae

- Diodia virginiana* L.

## Cucurbitaceae

- Citrullus Citrullus* (L.) Small  
*Sicyos angulata* L.

## Ambrosiaceae

- Xanthium chinense* Mill.

## Carduaceae

- Conoclinium coelestinum* (L.) DC.  
*Aster* 3 sp.  
*Pluchea petiolata* Cass.  
*Spilanthes repens* (Walt.) Michx.  
*Eclipta alba* (L.) Hassk.  
*Bidens discoidea* (T. & G.) Britton  
*Bidens frondosa* L.  
*Parthenium Hysterophorus* L.

## Cichoriaceae

- Sonchus asper* (L.) All.

## Plants found on the "Island"

## TREES

*Salix nigra* Marsh.  
*Salix longifolia* Muhl.  
*Platanus occidentalis* L.  
*Populus deltoides* Marsh.  
*Gleditsia aquatica* Marsh.

## SHRUBS

*Adelia acuminata* Michx.  
*Amorphia fruticosa* L.

## VINES

*Ampelopsis arborea* (L.) Rusby  
*Ampelopsis cordata* Michx.  
*Smilax Bona-nox* L.  
*Campsis radicans* (L.) Seem.  
*Rhus Toxicodendron* L.

## Herbs

## Typhaceae

## Alismaceae

*Sagittaria* sp.

## Poaceae

*Eragrostis hypnoidees* (Lam.) B. S. P.  
*Eragrostis glomeratus* (Walt.) Dewey  
*Leptochloa filiformis* (Lam.) Beauv.  
*Eleusine Indica* (L.) Gaertn.  
*Syntherisma sanguinale* (L.) Dulac.  
*Paspalum eilatatum* Poir.  
*Panicum capillare* L.  
*Panicum dichotomiflorum* Michx.  
*Echinochloa colona* L.  
*Echinochloa crus-galli* var. *mitis*  
 (Pursh) Peterman

## Cyperaceae

*Cyperus* 4 sp.  
*Fimbristylis autumnalis* (L.) R. &  
 S.

## Commelinaceae

*Commelina nueiflora* L.

## Polygonaceae

*Persicaria* sp.

## Chenopodiaceae

*Chenopodium ambrosioides* L.  
*Chenopodium anthelminticum* L.

## Amaranthaceae

*Amaranthus retroflexus* L.  
*Amaranthus viridis* L.

## Tetragoniaceae

*Mollugo verticillata* L.

## Brassicaceae

*Roripa palustris* (L.) Bess.

## Rosaceae

*Rubus trivialis* L.  
*Rubus* sp.

## Fabaceae

*Sesban exaltatus* (Raf.) Rydb.  
*Strophostyles helvola* (L.) Ell.

## Euphorbiaceae

*Croton capitatus* Michx.  
*Acalypha Virginica* L.  
*Chamaesyce humistrata* (Engelm.)  
 Small

## Malvaceae

*Hibiscus lasiocarpus* Cav.  
*Sida rhombifolia* L.

## Lythraceae

*Ammannia coccinea* Rottb.  
*Rotala ramosior* (L.) Koehne

## Epilobiaceae

*Jussiaea decurrens* (Walt.) DC.  
*Jussiaea leptocarpa* L.

## Dichondraceae

*Dichonera carolinensis* Michx.

## Convolvulaceae

*Ipomoea lacunosa* L.  
*Ipomoea triloba* L.

## Solanaceae

*Solanum nigrum* L.

## Heliotropiaceae

*Heliotropium Ineicum* L.

## Verbenaceae

*Phyla lanceolata* (Michx.) Greene

## Rhinanthaceae

*Mimulus ringens* L.  
*Ilysanthes inaequalis* (Walt.) Pen-  
 nell  
*Conobea multifida* (Michx.) Benth.



## Rubiaceae

*Dioda virginiana* L.

## Ambrosiaceae

*Xanthium chinense* Mill.  
*Ambrosia artemisiifolia* L.  
*Iva caudata* Small.

## Carduaceae

*Conoclinium coelestinum* (L.) DC.  
*Aster* 3 sp.  
*Pulchea petiolata* Cass.  
*Spilanthes repens* (Walt.) Michx.  
*Eclipta alba* (L.) Hassk.

## Cichoriaceae

*Sonchus asper* (L.) All.

Plants found inside of the old levee on the  
west side of the river.

## TREES

*Salix nigra* Marsh.  
*Salix longifolia* Muhl.  
*Populus deltoides* Marsh.  
*Platanus occidentalis* L.

## HERBS

## POACEAE

*Eragrostis hypnoides* (Lam.) B. S. P.  
 \**Eragrostis caroliniana* (Spreng.)  
 Scribn.  
*Eleusine Indica* (L.) Gaertn.  
*Capriola Dactylon* (L.) Kuntze  
*Syntherisma sanguinale* (L.) Dulac.  
*Chaetochloa glauca* (L.) Scribn.  
*Panicum eichotomiflorum* Michx.  
 \**Panicum capillare* L.  
*Echinochloa crus-galli* var. *mitis*  
 (Pursh) Peterman

## Cyperaceae

*Cyperus rotundus* L.  
 \**Cyperus* 4 sp.  
 \**Fimbristylis autumnalis* (L.) R. &  
 S.  
 \**Fimbristylis Vahlia* (Lam.) Link

## Polygonaceae

\**Persicaria* sp.

## Chenopodiaceae

\**Chenopodium ambrosioides* L.  
 \**Chenopodium anthelminticum* L.

## Amaranthaceae

\**Amaranthus anthemifolia* L.

## Tetragoniaceae

*Molugo verticillata* L.

## Brassicaceae

*Roripa palustris* (L.) Bess.  
 \**Roripa obtusa* (Nutt.) Britton

## Mimosaceae

\**Mimosa strigilosa* T. & G.

## Fabaceae

*Strophostyles helvola* (L.) Ell.  
*Sesban exaltatus* (Raf.) Rydb.

## Euphorbiaceae

\**Chamaesyce humistrata* (Engelm.)  
 Small  
 \**Croton* sp.

## Malvaceae

\**Sida acuta* Burm.

## Loganiaceae

\**Polyprenum procumbens* L.

## Sapindaceae

\**Careiospermum Halicacabum* L.

## Lythraceae

*Ammannia coccinea* Rottb.  
*Rotala ramosior* (L.) Koehne

## Epilobiaceae

*Jussiaea decurrens* (Walt.) DC.  
*Jussiaea leptocarpha* L.

## Convolvulaceae

\**Ipomoea lacunosa* L.  
 \**Ipomoea triloba* L.

## Solanaceae

*Solanum carolinense* L.

## Heliotropiaceae

*Heliotropium Indicum* L.  
 \**Heliotropium Europaeum* L.

## Verbenaceae

*Phyla lanceolata* (Michx.) Greene

## Rhinanthaceae

*Ilsanthes inaequalis* (Walt.) Pennell*Conobea multifida* (Michx.) Benth.

## Rubiaceae

*Diodia virginana* L.

## Cucurbitaceae

\*One species not yet identified

## Ambrosiaceae

\**Xanthium chinense* Mill.\**Iva caudata* Small.

## Carduaceae

*Conoclinium coelestinum* (L.) DC.\**Aster* 3 sp.\**Solidago* sp.\**Spilanthes repens* (Walt.) Michx.*Eclipta alba* (L.) Hassk.

NOTE. Plants starred were collected and in the herbarium. The others were recorded in the field notebook.

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